means for splitting the polarized beams into measurement and reference beams without altering the characteristics of the polarized beams;

means for causing the reference beams to interfere;

a reference photo detector for detecting the reference beams and providing a reference signal;

means for causing the measurement beam to strike the object of interest at an oblique angle after passing through a glass plate having a polarization coating on the bottom surface close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface of the polarization coated glass plate and the P polarization refracts through the glass plate, the P polarization reflects from the substantially non-transparent object of interest and refracts to the glass plate;

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means for causing the reflected S and P polarization beams from the bottom surface of the glass plate and the surface of the object respectively to interfere;

a measurement photo detector for detecting the measurement beams and providing a measurement signal; and

means for determining the distance between the bottom surface of the glass plate and the object surface based on the phase difference between the measurement and reference signals from the measurement and reference photo detectors.

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11. (Amended) A system according to claim 9 for measuring the optical gap between two surfaces, one of which is transparent, which further includes means for

scanning beams parallel to one another by positioning the acousto optic deflector between two focusing lens such that, the distance between the two focusing lens is equal to the sum of their focal lengths, and the scanning area is increased or decreased by varying the focal length of the two focusing lenses and by positioning the acousto optic deflector closer to or away from the first focusing lens in the direction of the beam.

16. (Amended) A method for high speed and precision measurement of the distance between at least two near contact surfaces, one of which is an optically transparent element and the other is a substantially non-transparent element using heterodyne interferometry, comprising:

producing with a laser source,an output having two superimposed orthogonally polarized beams having S and P polarization, with a frequency difference between them;

splitting the polarized beams into measurement and reference beams without altering the characteristics of the polarized beams;

means for causing the reference beams to interfere;

detecting with a reference photo detector the reference beams and providing a reference signal;

causing the measurement beam to strike the object of interest at an oblique angle after passing through a glass plate having a polarization coating on the bottom surface close to the object of interest, the oblique angle is such that the S polarization of the incident beam is reflected from the bottom surface of the polarization coated glass plate

and the P polarization refracts through the glass plate, the P polarization reflects from the substantially non-transparent object of interest and refracts to the glass plate;

causing the reflected S and P polarization beams from the bottom surface of the glass plate and the surface of the object respectively to interfere;

detecting with a measurement photo detector the measurement beams and providing a measurement signal; and

determining the distance between the bottom surface of the glass plate and the object surface based on the phase difference between the measurement and reference signals from the measurement and reference photo detectors.

26. (Amended) A method of measuring the optical gap between two surfaces, one of which is transparent in accordance to claim 24 which further includes scanning beams parallel to one another by positioning the acousto optic deflector between two focusing lens such that, the distance between the two focusing lens is equal to the sum of their focal lengths, and the scanning area is increased or decreased by varying the focal length of the two focusing lenses and by positioning the acousto optic deflector closer to or away from the first focusing lens in the direction of the beam.

REMARKS

Applicants respectfully request reconsideration of the above-identified patent application in view of the above amendments to the claims and the following remarks.